

# The Power of Data Analytics: A Spend Analysis of E-Procurement in UN Agency



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## **Declaration**

I certify that this research work titled “*The Power of Data Analytics: A Spend Analysis of E-Procurements in UN Agency*” is my work. This project will also be part of organizational change strategy to achieve sustainable goals.

Signature of Student

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## **Abstract**

The objective of this business project to examined special effects of Electronic Procurement (E- Procurement) on the performance of the procurement function of UN Agency. It is hoped the result of this study will enable the Agency to increase their competitiveness. The study concludes that E-procurement is statistically significant and influences performance of UN Agency. The study found that there is existence of a positive association of e-procurement to performance of UN Agency. The business project findings reveal that majority of the organizational defendants indicated that E-procurement process influences performance of procurement function in the organization largely. The research used descriptive research design seeking to unveil the effect that E-procurement has on organizational performance of UN Agency, more specifically in UNDP. Data is analyze using Excel. The analyzed data is interprets and present in pivot tables, and charts. Analyses done in business project by excel to test the relationship variance between the independent variables and dependent variables. The research recommends that UN Agency should use a standard e procurement procedure to ensure high levels of performance. There is need to conduct further a similar project in other organizations for attempts to compare the findings. There also exists gap for a business project on the challenges facing implementation of e-procurement in organizations.

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## **Chapter 1: Introduction**

In the era of technology, the world is fast stimulating and also impact on the business and organizations as well. As technology is influencing in every field of life including business but still business community is facing several challenges Starters of business which deals on different paradigm either they are the manufacturers, wholesaler, retailers, etc. failed in flourishing their businesses without knowing where they are lacking to attract the customers by ignoring the fact that the one of the basic element of business is e-procurement they move towards the other approaches rather than to grip the root. Here is the solution for them in the form of data analysis technique which plays the important role in empowering the business leaders to make their decisions rational on the basis of data analysis. The analysis of data would be in the term of statistics, graphical presentations, trends prevailing in the market, and other fact-based information related to the market. Data analytical tool helps the business manager to find out the gaps where they are lacking and try to fill those gap and make rational decisions for the progress of their businesses.

For many years in the UN system, the procurement function was considered as insignificant transaction-oriented back office function that more often than not was fragmented and managed haphazardly. E-procurement has lately augmented dominance in many companies worldwide due to technological progressions which have made business procedures easier, faster and more efficient in today's competitive global village. It encompasses all activities involved in obtaining goods and services and managing their inflow into an organization toward the end user through the internet. It also referred to the use of internet-based system to transmit out individually or all phases of procurement process, which includes search, sourcing, negotiation, ordering, receipt, and post-purchase review. This has been facilitated by the growth in information and communication technology which has led to electronic commerce, commonly referred to as e-commerce.

The growth in e-commerce has been substantial towards the espousal of new supply chain-related skill and presentations by organizations worldwide. Like other functions embraced by e-commerce, the procurement function has positively been impacted with a predicted growth in e-procurement applications covering both transactional buying and strategic sourcing activities. E-Procurement analytic is based on an analytical



modeling and simulation technique of System thinking. The whole approach is “to analysis that focuses on the way that a system’s constituent parts interrelate and how systems work overtime and within the context of larger system”. The main motivation of this business project is to study the effectiveness of systems thinking in the currently procurement practices in the organization by comparing decisions made with and without the use of analytical techniques. Data analytics refers to the process of examining datasets to conclude. Use of mechanical and systematic process ensures that the decisions and the conclusions made are realistic and accurate. Now a day, data analytic techniques practicing in various industries including the development and corporate sectors. These data analytics applications helped the United Nations Development Agencies like UNDP, IOM, WHO, FWO and many others working in Pakistan to shape their procurement process for effective and timely decision making. Data Analytics has been used widely in various departments including Operations, Human Resource, Finance and Procurement. In United Nations Development Program (UNDP), the annual quantum of procurement during the year 2009-2018 ranged from \$14 billion to \$19 billion. Because of this high volume of transactions, there is a need to manage the risk associated with its processes to ensure timely and continuous improvements.

In recent past, there has been increased adoption and usage e-procurement in major procurement functions of United Nations Agencies. The adoption of e-procurement in UN Agencies could be influenced by several factors, besides that of integrating the buyer in the procurement system within the organization in a bid to procure the right products, at the right price from the right supplier in addition to accountability in the organization expenditure. The potentials of e-procurement have already been proven in several studies. According to these business projects, E-procurement qualifies organizations near for reorganize operational procurement processes and unify strategic procurement processes because of the advanced supply chain pellucidity provided by E-procurement systems. However, there is limited empirical literature proceeding the significant impact of E-procurement on recital of UN Agencies. This research project highlighted the procurement processes used in UNDP and the areas where improvements can be made using data analytic techniques and implementation of E-procurement.

## **1.1 Problem Statement**

The procurement process leveraging in the well-organized ERP system SAP PRISM. Which accelerates the process but failing to provide the procurement detail of suppliers and service provider, which hampers to achieve sustainable goals, and lacks procurement analytics that hampers the management to make targeted decisions. The issues, which need to be addressed through this business project, are

Budget and Purchase Variances which not regular checked and Failure to achieve Key Performance Indicators along with the incomplete database of vendors.

The adoption of e-procurement plays a significant role in improving the effectiveness and efficiency of organizations' procurement functions. The procurement department could contribute enormously to the organization's vision and the bottom line if it adopts proper technologies. Technology adoption helps the procurement department to buy explicitly obligatory in the organization at the right time, and quality for different departments and users inside the business. An organization could originate advantages from e-procurement and therefore be competent to oblige their clientele (both internal and external) better (Nelson, et al., 2001).

On other hand, stipulation the procurement division performance were ineffective in procurement work, other divisions in organization can adversely and severely affect. Adoption of e-procurement could make it stress-free to procure, which business needs. Hence, this business project attempted to institute the effect of E-procurement enactment of UN Agency intending to channel this gap in knowledge that exists. The project focused on a selected UN Agency called UNDP.

## **1.2 Significance of the problem**

Procurement processes in every organization play a vital role in delivering the results in terms of cost-saving, and to maintain efficiency, effectiveness and timely completion of desired tasks. However, due to lack of systematic process and practices in procurement, there was a continuous demand from the higher management to look for ways to make improvements in current processes as many of the decision made by the higher management was based on results delivered from this department. To achieve this efficiency, there was a need to establish the key performance indicators (KPIs) and to monitor the results after the implementations. See appendix-B in appendix as reference.

## **Chapter 2: Literature Review**

E-procurement refers to the purchase of goods and services for organizations through the internet. The introduction of e-procurement by a firm for integrated supply chain management could lead to better efficiency and effectiveness as compared to existing supply chain systems. The e-procurement systems if used properly can lead to higher quality products, enhanced productivity and reduced space in the warehouse and ultimately increase logistics efficiency and flexibility. All e-procurement applications aim to improve the efficiency of procuring personnel, automating the approval cycle, enabling negotiation of better contract pricing, leveraging existing contracts more effectively and reducing off-contract purchases.

### **2.1. The Role of E-Procurement and Organizational Performance**

Combating corruption and building capacity in procurement has helped governments maximize the buying power of their budgets and improve the quality of service delivery to their citizens especially the marginalized. Competitive and transparent public procurement systems are seen as a key element to achieving sustainable development and more prosperous marginalized. E-procurement system holistically tackles underlying issues affecting hospital performance such as lack of access to information for civil society partners and the public. Driven by the increasing trend toward purchasing inputs and other raw materials from outside the organization, implementing electronic procurement (e-procurement) has become a significant tactic in most companies' e-business strategies (Handfield & Nichols, 1999).

Today baseline procurement capabilities are rapidly becoming a cost of doing business. More and more companies are conscious of the needs to introduce Internet-based technologies in their order process, due to the benefits of saving transaction cost, increasing competitive sourcing opportunities, and enhancing inter-organizational coordination. Internal customer satisfaction, through E-Procurement function can usually contribute to the competitive position of any company in many other ways than first through cost serving. Product standardization internal customer satisfaction can be enhanced through E-procurement due to the product variety concept. This can be achieved by reducing the number of different components and or the number of

suppliers via set product standards. Contribution to product design and innovation of then innovation in industry come from suppliers or are results from intensive interactions between suppliers and user department in any organization.

## **2.2 Procurement Implementation and Performance of UN Agency**

The factors affecting implementation of electronic procurement system in the UN Agencies are costs associated with the implementation of e-procurement were found to have a direct impact on the Organizations. The study further established that training of users and management's support has a positive impact on the implementation of the e-procurement system; turnover of the employees' required continuous training for the incoming staff; formal recognition backed by legislation of the electronic procurement transactions should be encouraged to accelerate the' rate of implementation of the system within UN Agency; integration of the organizations system and those of the suppliers; demonstration of the positive impact of the system and installation of linkages between all UN agencies should be encouraged for faster Implementation of the e-procurement system in the UN Agencies (Whyte,2000).

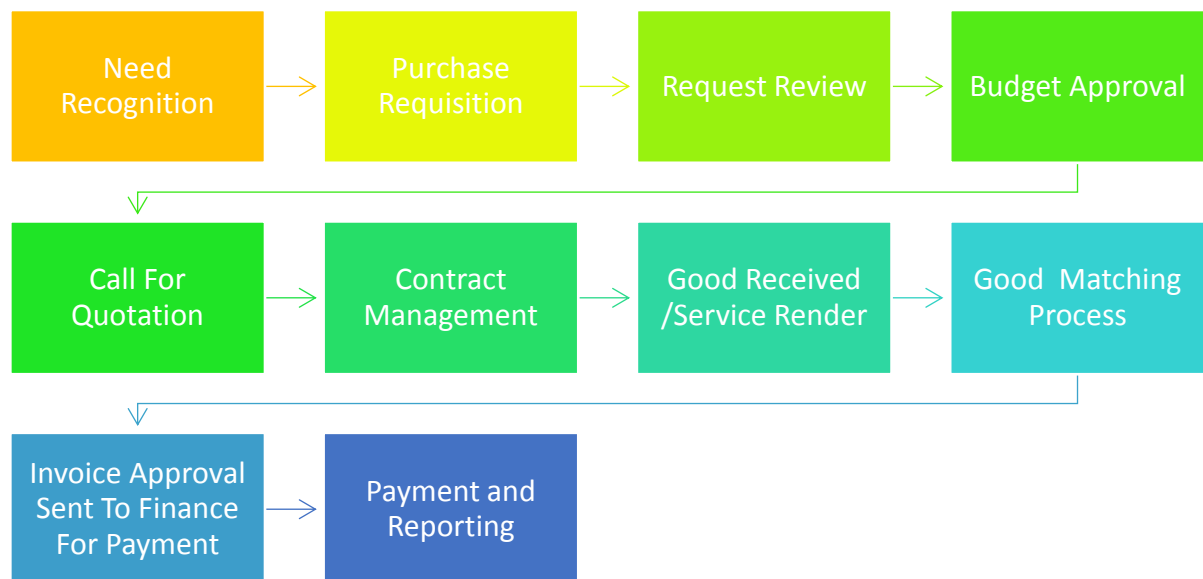
Procurement entails the different ways through which UN Agency acquire goods and services needed for their day to day operations. Procurement of goods and services is a function that takes place in the upstream part of the supply chain. Through procurement large amounts of money of an organization are spent. Procurement is important to any organization since through it the strategic objectives of organization can be met when well-co-ordinated and linked to other sectors. Measures are put in place to check losses arising through procurement of substandard goods and also procuring goods and services at very high prices. With the advent of e-procurement organizations have embraced it to help check the shortcomings of the initial traditional procurement methods.

## **2.3 Procurement Process and Performance of UNDP**

Any good e-procurement software system today is designed to greatly reduce effort and time required to complete purchasing transactions by eliminating traditional paper chain of payment reconciliation, approvals, requisitions and receiving. The key features of e- procurement approaches enables users to find an item in an electronic catalog, create a requisition, route the order requisition for approval, create and transmit the order to vendors, and also help to automate the invoicing and payment process. To attain the greatest benefits, procurement processes should be evaluated and improved

before adopting e-procurement tools. Internet technologies enable integration with trading partners to amplify the need for fundamental organizational change (Whyte, 2000).

E-procurement is more likely to be beneficial in dispersed supply chains as it facilitates its coordination. Effectiveness involves comparing goals and results of the organization. Furthermore, for organization to minimize disputes, appeals and clarification requests from the suppliers, e-procurement plays a key role. This is because they are sure signals of a mismatch between goals and quality of results. E-procurement also helps in dematerialization. This involves using e-procurement in organization's operations as an operation standard to trigger dramatic turnaround in paper consumption, given a favorable normative framework. This could happen due to different reasons such as great documents retention in e-procurement platforms; the value of digital signatures that have the same value as the autograph; the use of email instead of fax; the reduced or eliminated need to print hard copies hence facilitating in dematerialization. The below figure one elaborates the procurement process which follows by the organization



*Figure 1- The Procurement Process at UNDP*

E-procurement is the application of information technology with a view to creating a procurement process which satisfies the dynamics within the environment. At one point or the other, all countries will embrace the electronic procurement concept.

Specifically, in the UNDP, e-procurement is driven by social, cultural and political factors. Implementation of e-procurement in UN Agency requires resources and specialized skills. In addition, the process requires a well-coordinated change management system and training program. It is also important to put into place practices, processes and systems for the implementation of e-procurement. Other factors that are critical in the implementation of e-procurement include good governance and capacity developments. The Procurement Process at UNDP has following steps:

- **Needs Recognition:** The initial step for procurement process at UNDP included the demand from the requesting department with the cost estimates after approval from the department head.
- **Request Review and Purchase Requisition:** After the recognition of need, the next step at UNDP was to create a purchase requisition (PR), stating the quantity, quality, and the date when the supplies or the services were required. Procurement department after receiving the PR starts working by reviewing the request and availability of budget for that specified request and after review procurement generates the PR in SAP (shown in Appendix as Appendix -A for reference).
- **Budget Approval and Creation of PO:** Before the procurement department raise the purchase order, the finance department gives the work break down structure (WBS) against specific budget, which is the approval for the budget.
- **Call for Quotation:** The request of quotation call from specialized vendors for cost analysis, after ensuring the quality, dates of delivery and other terms and conditions, vendor get selected.
- **Contract Management:** After the shortlisted of vendors from the above step, the selected vendor oblige to sign the purchase order with all the terms and conditions mentioned in purchase order that binds both the parties to abide by the contract.
- **Goods Received / Services Rendered:** After the signing of purchase order, the vendor delivers the goods or renders the services within the stipulated timeline as they agreed upon in the contract management. After receiving the goods procurement department inspect the procured goods and issues the good receipt note.

- Good Matching Process: In good matching process, the procurement department align the received goods with Purchase Order, Quotation Received and Vendor final invoices.
- Invoice for Payment and Reporting: After the above steps, the final documents follow the PO and invoices from the vendor finally send to the finance department for final payment according to the term of payment.

#### 2.4 Procurement KPIs.

The efficiency of the procurement department measure through the metrics called the KPIS which helps the organization to measure spending, quality of good received and time and cost analysis. Although in our organization do not have well established set of KPIs, so there was a need to measure performance and effectively manage processes ensuring the cost efficiency, for that reason, these KPIs have been identified in the research study;



*Figure 2 - Procurement Process KPI*

## **Chapter 3: Research Methodology**

The business project measured the significant importance of data analytics in procurement process in the UN Agency specifically in UNDP. The business project has used the real time data of last five years.

### **3.1. Research Design**

In this study, the choice of the research design was guided by the research question(s) and objective(s), existing knowledge, time and resources. The study adopted an explanatory research design. The strategy was selected because it is helpful in exploration to answer who, what, where and how questions in human resource research. Through the explanatory research, the study sought to investigate the impact of e-procurement on performance of UN agency. The study takes into consideration both the descriptive and predictive analytics as aimed to describe the significant importance of analytics in the performance of the organization. The business research based upon the real data gathered from the organization for the last five years are extracted from the PRISIM SAP. The extracted data which was called as the raw data or initial extracted data had the Purchase Order Number, Item description and Master agreement number (contract number). It also includes award date or Purchase order creation date or awarded and vendor numbers, unique codes are being generated in SAP for identification or segregation of each transaction.

### **3.2 Population and Sampling Design**

A population is defined as a complete set of individual cases or objects with some common observable characteristics. A particular population has some characteristics that differentiate it from other populations. The study focused on UN agency UNDP. The accessible population was procurement officers and staff of the procurement department in these four UN agencies.

#### **3.2.1. Sampling Design**

Sampling design involves selecting some of the elements in a population from which a researcher may draw conclusions about the whole population. The sample frame of the study (list of the employees in the agencies) was obtained from the relevant human resources office of UNDP.



### **3.2.2 Data Analysis Methods**

The purpose of data analysis was to prepare raw data for presentation and statistical inference. The data collected went through data preparation, which involves editing, coding, classification and tabulation so that they are amenable to analysis. The primary data was analyzed through descriptive statistics such as ratios, percentages and averages. Editing detects errors and omissions, corrects them when possible, and certifies that maximum data quality standards are achieved. The editing of data guaranteed that data is: accurate, consistent with the intent of the question and other information in the survey, uniformly entered and averaged to simplify the coding and tabulation.

### **3.3 The Pre Analysis phases of Data Analytics**

As it is mentioned in the previous chapter of this study, the data extracted lacks the components were needed to make analysis. Statistical package for social sciences (SPSS) was used to analyze data. Multiple phases of analytics were used for analysis to establish the relationship between the study variables. Pre-analytics phase components include ways to extract raw data, designing the strategy for carrying out the whole analytical procedures and to set clear measurement priorities (Turban et al., 2000).

#### **Step 1: Identification of Purchase Order Number**

Purchase orders generated in SAP PRISM once the Purchase request approved followed by budget allocated to the purchasing request. These purchase orders created reflects breakdown structure (WBS), and delivery dates and price. To perform Classification of Data Set, to implement the 80/20 principle (80 is Head 20 is tail spending), procurement ratios and measuring contract versus non-contractual spending

#### **Step 2: Sub-categorization of the spending**

Spending divided into sub-categorization

- Spending without contract
- Spot Buying where the efficiency can be improved

### **The Pareto or 80/20 Principle:**

The first step was the analysis of the 80/20 called the golden Pareto principle. Purchases that belongs the top 80% will be under class of major spending and every purchase belongs to the rest 20% will be under tail spending. For this, a new column added in the data sheet that has been marked with "Spend Class." In order to differentiate the spend class, pivot table in excel has been used and commodity detail in the row section and total Purchase order value in the value section of the pivot table .(See Appendix -C in Appendix for Reference )

VLOOKUP formula for Pareto with below description.

=VLOOKUP (Commodity Description, RAW DATA Sheet, Total PO Value, False)

### **Contract and Purchase order Management Analysis:**

For contract and purchase order management analysis we use excel tool to get outcome

=IF (I3,"Contract Available," "Contract Not Available")

This analysis will help to build better internal controls for organization. Purchase Order availability is the same analysis made for contract management which helps to evaluate the number of purchase order against each purchase. Excel helps to extract the data from the agreement number with following formula.

=IF (K3", "PO Available", "PO Not Available")

### **Vendor Management**

The key element in every procurement is the vendor number assigned to each service or goods provider, for this, the system cannot tell the statistics of the involvement of the vendor in different procurement process. As far as analytics are implemented, this is bit tricky and useful part, system cannot show the number of vendors but the data provides us the detail of the description which is the key in this analytics which means the commodity description is the same for every purchase which can be extracted from data with different relations.

=COUNTIF ('Vendor Count'! A, 'Raw Sheet'! B3)

Vendor is further segregated into their class it means it shows the count of different vendors from where the organization is procuring. Vendor Class is also the integral part of vendor management process and this is used for analysis for better future decision, as the number of vendors are already found for each material description procured and can be further classified by making segments and categorized as;

Single Vendor Source: in which vendor counts is one

Vendor Source, which ranges from 1-5

More than Five (>5) where the source is procured from > 5

For the vendor class analysis, use the formula in excel, to segregate the vendor for single or multiple products by using IF condition formula.

=IF (Y3=1,"single vendor," IF (AND (Y3>1, Y3<5),"Between1and5,""more than 5"))

### 3.4 Spend Analysis

Spend analysis involves gathering financial and non-financial data and to make analysis and to form judgments. This helps in achieving cost efficiency and reduces the practices causing delays or higher cost to organizations. Procurement analytics is the main tool that helps to collect, cleanse, classify and helps to analyze the spending made by procurement using appropriate IT tools. The Spend analysis is one of the key elements in the organization for procurement which is proactively used by the organizations to mitigate the risk and to optimize the organizational buying and saving power. It is now considered the fundamental tool of sourcing and extensively used by the management for superior performance engineering. Data used for analytics can be beneficial to improve the management vision for achieving efficiency and drive for performance improvement.



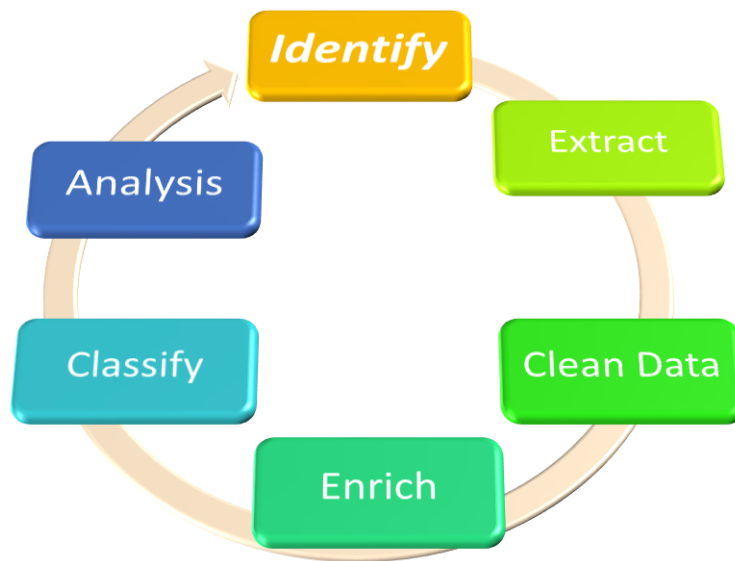
*Figure 3 - Spend Analysis*

Spend analysis provides a foundation through which improvements in current process can be made as this technique provides ideas and guidelines for future strategies for short and long run objectives ensuring the time value of money. In General, the analysis

pulls the purchase history to find out the solution to some of the below requirements (Handfield, Nichols, 1999).

- Nature of Organization?
- Types and nature of requests often made by different departments and how often customer buy?
- When did customer buy and how much customer pay?
- What Vendor actually delivered?
- **Sources of Spend Analysis:** The followings are the most used sources of spend analysis.
  - Purchase Order (PO) history
  - Codes used in SAP PRISM in extracting details of Payments
  - Organization Financial Data
- **Spend Analysis KPIs:** Spend analysis data can be sliced and diced based on a vast number of KPIs. Some of the most common KPIs includes:
  - Spending by category
  - Number of Vendors by industry code
  - Number of financial transactions made during specific period
  - Purchase Orders created during the period
  - Payment terms and conditions
- **Spend Analysis Steps Involved:** Data in spend analysis may vary from organization to organization but following are some of the steps that are being

used in our organization to smooth line the procurement process.



*Figure 3 - Spend Analysis In six Steps*

*Identification of Data Source, First step involves identification of different data source in which organization spend money for procurement and business area. Data Extraction, This step involves extraction of data from the SAP PRISM using financial and non-financial codes and consolidates into single data base Data Cleaning and Enrichment, Conversion of data into Project currency and functional currency. Data Enrichment involves enhancing and improving the raw data extracted at step 2 to make sure that all headings and line level names and details are appropriate for further process. Classification, refers to the grouping for effective analysis, involves groping in sort of supplier, and business area. Analysis of Data, in this phase the already extracted data that already cleansed and enriched ready for analysis.*

### **3.5 Types of Analytics:**

- Descriptive Analytics
- Predictive Analytics
- Prescriptive Analytics

#### **3.5.1. Descriptive Analytics:**

The descriptive analyses gather the data coming in real time and the historical data insights to measure the future approach .The main objective of this is to measure the circumstances of success and failure in the past in which the event or activity occurred. In our business project and in our organization, data sources are extracted and would be used to make decision by reviewing the past activities to make future decisions. This analysis can be helpful to leverage to understand the overall performance of the organization.

### **3.5.2. Predictive Analytics:**

Predictive analysis consider past data patterns and trends to get the informed decision about what is going to happen in the future to make the realistic goals ,with the help of simple statistical tools and excel models and formulas, likelihood of future outcome are predicted.

### **3.5.3. Prescriptive Analytics**

Prescriptive Analysis is advance analytics, which base on, sophisticated Optimization process for how to achieve it and mark the data uncertainties for better decision.

## **Chapter 4: Results and Findings**

This chapter addresses the results and findings collected from the field based on the effect of e-procurement on performance of UN Agency. The findings are presented in the order of the research objectives. In this chapter, the analysis phase and results are discussed that are found after the pre-analytics of data extracted from SAP, as analytics is the process of dicing and slicing for the gap analysis and Pareto principle. This chapter will drive the benefits of results that are set in pre-analysis phase.

### **4.1 Determination and Analysis of Hidden Tails:**

The hidden tail in this context is the spend made by the organization where the organization made a pre-negotiated contract agreements without a Purchase order which can be regarded as “Purchase made outside of Pre-Negated Contracts” also. It is the most ignored part of the Pareto principle in practical. The analysis of the major procurement will be formed by organization by making two subcategories as major spending;

- ✓ With contract Spending by Organization: \$ 343 M
- ✓ Without contract Spending by Organization: \$ 69 M

### **4.2. Cost Saving Analysis having Single Vendor through Hidden Tail:**

In the previous step, the slicing and dicing of the data was done to find out the hidden tail analysis, but the question arises that how to consolidate by using the commodity detail of vendor used in extracted data, previous analysis was managed thoroughly with the detail of availability of contract. See Appendix -E in Appendix as Reference. Analyzing of the condition in which procurement was made is needed under which the “contract not available” conditionally so that the total spending is analyzed out of \$ 108 M to tail spending. In this analysis, it will not be limited to 20 % or tail spending as both the spending will be consolidated which will incorporate the purchase order and vendor class altogether. EXCEL STEP involves adding the Contract and Spend Class in Filter and Vendor name in ROW of the Pivot table. See Appendix -F in Appendix. These analytics will help to make the decision regarding the

- ✓ Procured Items with one Purchase Order with One Vendor
- ✓ Procured Items with more than one Purchase Order and involvement of more Vendors usually >5

#### **4.3 Procured items with single PO and vendor:**

From the above analytics, analytics are further narrowed down towards the cost saving, purchase order interrelates between the different vendor procurement. See Appendix - G in appendix as reference.

#### **4.4. Procured item with more than 1 PO and involvement of > 5 vendors:**

The second scenario is the involvement of more than five vendors, for which the adjustments can be consider in pre-analysis by setting the ceiling about the goods procured by setting the amount between \$ 0.1million to \$ 0.2 million; the management from time to time in future can use this. See Appendix -H in appendix as reference.

#### **4.5 Purchase price variance analytics:**

As above relates to vendor and purchase price, this analysis will concentrate on inconsistencies happened in the price of procured similar items, this will help to give the management picture of price variations charged by vendors and will help to reduce gap. For this, the logic must be implemented in the extracted data and arrange the data in the pivot table accordingly. The contract column is put in the filter section of the pivot table to segregate the contracts available and not available through filter functioning of excel. The following excel formula is used =IF (D26>zero, (E26/D26)\*100,"NA"). This analysis is performed to find the procured items with “High and Low Purchase Price Variance Preferably High Purchase Price Variance”. In this analysis, Purchase price variance range assumes from 15% to 550% and get analysis of indirect procured items. See Appendix -I in appendix as reference.



## **Chapter 5: Discussion, Conclusion and Recommendations**

The basic purpose of this chapter is to give summary of the findings, conclusions and recommendations of the study. This was based on the research findings presented and discussed in the previous chapters. The study established several findings which make a direct contribution to knowledge and policy formulation. Recommendations both for further research as well as policy and practice have been made. Detailed analysis of extracted data come out with the benefits that can help to conclude our business research report and find the management to come out with new performance indicators or objectives that change from time to time.

- **Helping to make good quote score analysis:**
  - ✓ Cheap Product Supplier: 1 Point Awarding
  - ✓ Expensive Product Supplier: 5 Points Awarding

At the end of period either quarter, midyear, or a full complete year, that will be able to consolidate and filter the supplier list with their points and find competitiveness. In this business project, a systematic way is developed in the extracted data set preparation journey, where initially, there are only a few details about the analytical tools implemented and then proceeded to the dicing and slicing mechanism for tail spend analysis also called 80/20 rule and successfully identified the hidden tail in our procurement data. The analytics results show the tail spend analysis amount of USD 669,842.74 (Appendix D) which could be beneficial and cost effective to the UNDP if analysis is made quarterly or mid yearly to set target for next year. The approaches that are identified with the help of analytic results which has helped to minimize the cost are below;

### **Category Analysis:**

Developed process for accurate mapping the products and items to define spend categories and then segment each spent category based on their history, frequency and their value of transition.

### **Buying Behavior:**

Helps to understand the buying pattern and behavior to aggregate spending across buyers and to analyze transaction channels and associated costs.

### **Supplier Concentration:**

The analytics also showed the benefits that UNDP could take by implementing the analytical tools in their practices that will help to analyze and identifies the cost saving through vendor analysis (Appendix F ) which shows the more than 5 vendors involves to procure the similar product. The project analytics also helped to identify the purchase price variance of organization (Appendix I).

### **5.1. Recommendations for Further Studies:**

This study sought to determine the effect of e-procurement on performance of United Nations Agency by attempting to bridge the gap in knowledge that existed. Although the study attained these, it mainly focused on one organization. There is need to conduct a similar study in other organizations in an attempt to compare the findings. There is also need to conduct a study on the challenges facing implementation of e-procurement in organizations.

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## **Appendices**

**Appendix-A**

| PURCHASE REQUISITION FORM   |             |  |     |                            |      |                        |                    |
|---|-------------|--|-----|----------------------------|------|------------------------|--------------------|
| Requesting Staff _____  |             |  |     | Purchase Request No. _____ |      |                        |                    |
| Department _____  |             |  |     | Date Prepa _____           |      |                        |                    |
| Mission _____   |             |  |     | Date Needed _____          |      |                        |                    |
| Justification for the request: _____  |             |  |     |                            |      |                        |                    |
|   |             |  |     |                            |      | Estimated Project Cost |                    |
| No.   | Description | IT Specifications<br>(if IT related equipment) | WBS | Qty                        | Unit | Unit Price             | Total              |
| 1   |             |  |     |                            |      |                        |                    |
| 2   |             |  |     |                            |      |                        |                    |
| 3   |             |  |     |                            |      |                        |                    |
| 4   |             |  |     |                            |      |                        |                    |
| 5   |             |  |     |                            |      |                        |                    |
| 6   |             |  |     |                            |      |                        |                    |
| * Indicate detailed technical specifications of item if goods or scope of work if services. Additional sheet may be used. |             |  |     |                            |      |                        |                    |
| Prepared by: _____  |             | Verified by IT Specs _____                     |     | Endorsed by: _____         |      | WBS Author _____       | Approved by: _____ |
| Received by: _____  |             |  |     |                            |      |                        |                    |
| _____   |             | _____  |     | _____                      |      | _____                  |                    |
| Head of Unit  |             |  |     |                            |      |                        |                    |
| Date _____  |             | Date _____                                     |     | Date _____                 |      | Date _____             |                    |
| <b>*Signature over Printed Name</b>   |             |  |     |                            |      |                        |                    |

*Figure 4- Purchase Requisition form*

## Appendix-B

| Commodity_Description  | Quantity | Unit<br>_Pric<br>e | Master_Agr<br>reement | Purchase_orde<br>r    | Award<br>_Date | Vendor_Code      |
|--|----------|--------------------|-----------------------|-----------------------|----------------|------------------|
| Parts, Accessories and Flowmeter system                      | 1        | 45.3<br>2          | MA2200GA<br>140000076 | DO220015091<br>520445 | 9/15/20<br>15  | HAC2179000       |
| Buts, Lock, Conduit, Steel                                   | 75       | 12.6<br>5          | MA1100GA<br>130000040 | DOM1100MA<br>X45150   | 12/3/20<br>14  | KBS6049140       |
| Sand, Silica   | 0        | 0                  | MA8600GA<br>090000006 | DO860011072<br>021404 | 7/20/20<br>11  | OSB8311222       |
| Shoes, Safety Toe  | 0        | 0                  | MA7400GC<br>100000003 | DO620014022<br>208468 | 2/22/20<br>14  | RED8315105       |
| Tool Straightener for Type K Copper<br>3/4 Inch              | 4        | 78.8<br>6          |                       | PO220014122<br>901229 | 12/29/2<br>014 | ACT7090725       |
| Impact Tools, Air Powered (Not<br>Road Building)             | 0        | 0                  | MA7400GC<br>120000003 | DO620012082<br>120258 | 9/27/20<br>12  | VC00001014<br>05 |
| TEE SCH 40 PVC 1/2 SLIP                                      | 10       | 0.25               | MA7400GC<br>110000004 | DO220012033<br>011249 | 3/30/20<br>12  | MSC6003170       |
| Storage Devices, Electronic (Disk<br>Drive Compatible)       | 7        | 9.95               |                       | PO220010040<br>705365 | 4/7/201<br>0   | OFF3505000       |
| Two-Way Radio Supplies, Parts, and<br>Accessories            | 2        | 121.<br>15         | MA6400GA<br>070000042 | DO640010021<br>211705 | 2/16/20<br>10  | TES8311882       |
| Hammer Ball Pen, W/handle size<br>No. 2/0 12 OZ              | 6        | 8.12               | MA7400GC<br>130000008 | DO220014080<br>818464 | 8/8/201<br>4   | MSC6003170       |
| 0.9% Sodium Chloride 250ml<br>Hospira (Abbott Labs) # 798302 | 300      | 0.86               | MA9300GA<br>120000098 | DO930014061<br>315090 | 6/13/20<br>14  | BOU8303524       |
| Lamps, Metal, Halide Type, Base<br>Burning any Positio       | 60       | 23.2<br>5          |                       | PO810012110<br>600781 | 11/6/20<br>12  | CON1261500       |
| Expendable Medical Supply per<br>Price Agreement             | 2065.58  | 1                  | MA7400S05<br>0378     | DO910010020<br>110399 | 2/1/201<br>0   | GEN2007500       |
| Splices, Wire/Cable, Compression                             | 50       | 27                 | MA1100GA<br>080000080 | DOM1100MA<br>X15605   | 7/19/20<br>11  | TEC4570250       |
| Drugs and Pharmaceuticals                                    | 0        | 0                  |                       | PO910012120<br>301243 | 12/3/20<br>12  | VC00001027<br>90 |
|  |          |                    |                       |                       |                |                  |

Table 1- Raw Data Extracted From SAP of UNDP

## Appendix-C

| Row Labels  | Sum of ITM_TOT_AM | Spend Class |
|---|-------------------|-------------|
| 0.4% Lidocaine D5W 250ml Hospira (Abbott Labs) # 793132 1g  | 0.00%             | Major Spend |
| 0.9% Sodium Chloride 1000ml Hospira (Abbott Labs) # 798309  | 0.01%             | Major Spend |
| 0.9% Sodium Chloride 250ml Hospira (Abbott Labs) # 798302   | 0.01%             | Major Spend |
| 0.9% Sodium Chloride 50ml Hospira (Abbott Labs) # 798413 In | 0.01%             | Major Spend |
| 102.4 3-SET O2-RESQ SYSTEM INCLUDES ADULT-MED.SIZED BiTRAC  | 0.02%             | Major Spend |
| 10G166 WHEEL BARROW PROFESSIONAL 5 CU FT CAPACITY           | 0.02%             | Major Spend |
| 12 inch GPL Louver w/Slotted Full Circle Visor w/ Universal | 0.02%             | Major Spend |
| 12 inch Tunnel Visor w/Universal Clips                      | 0.02%             | Major Spend |
| 120 AC Color VIVIDS Camera                                  | 0.10%             | Major Spend |
| 16D320 COOLER BEVERAGE PORTABLE CAPACITY 1 GALLON           | 0.11%             | Major Spend |
| 1AC92 SOCKET SET 3/8 IN DRIVE 8MM THRU 19MM IN CASE         | 0.11%             | Major Spend |
| 1AN12 SOCKET DEEP 12 POINT 1/2 IN DRIVE 9/16 IN             | 0.11%             | Major Spend |
| 1AN18 SOCKET DEEP 12 POINT 1/2 IN DRIVE 15/16 IN            | 0.11%             | Major Spend |
| 1CXL1 HAT SAFETY RANGER STYLE LIME LARGE / XLRG             | 0.11%             | Major Spend |
| 1JY38 WASHER FLAT USS ZINC 3/4                              | 0.11%             | Major Spend |
| 1KB51 BOLT HEX HEAD ZINC G5CT 5/8 X 2-1/2                   | 0.11%             | Major Spend |
| 1KB53 BOLT HEX HEAD ZINC G5CT 5/8 X 3                       | 0.11%             | Major Spend |
| 1KB68 BOLT HEX HEAD ZINC G5CT 3/4 X 3                       | 0.11%             | Major Spend |

Table 2 - Pareto Analysis

**Appendix-D**

| Row Labels                    | Sum of ITM_TOT_AM     |
|-------------------------------|-----------------------|
| (blank)                       | 45.32                 |
| #N/A                          | 11,946.60             |
| <b>Major Spend</b>            | <b>445,938,732.63</b> |
| <b>Contract Available</b>     | <b>349,163,289.92</b> |
| Po Available                  | 343,850,027.31        |
| PO Not Available              | 5,313,262.61          |
| <b>Contract Not Available</b> | <b>96,775,442.71</b>  |
| Po Available                  | 96,775,442.71         |
| <b>Tail Spend</b>             | <b>69,922,895.48</b>  |
| <b>Contract Available</b>     | <b>58,443,036.33</b>  |
| Po Available                  | 57,773,193.59         |
| PO Not Available              | 669,842.74            |
| <b>Contract Not Available</b> | <b>11,479,859.15</b>  |
| Po Available                  | 11,479,859.15         |
| <b>Grand Total</b>            | <b>515,873,620.03</b> |

Table 3- Head and Tail Analysis

**Appendix-E**

| Count of ITM_TOT_AM | Column Labels |
|---------------------|---------------|
| Row Labels          | Po Available  |
| Major Spend         | Grand Total   |
|                     | 96,775,442.71 |
| Tail Spend          | 11,479,859.15 |

|             |  |             |
|-------------|--|-------------|
| Grand Total |  | 108,255,302 |
|-------------|--|-------------|

Table 4 - Cost Saving Analysis

**Appendix-F**

| Count of No Of POS |              | Column Labels |               |              |
|--------------------|--------------|---------------|---------------|--------------|
| Row Labels         | Between1and5 | more than 5   | single vendor | Grand Total  |
| Between 1 and 12.  | 154          | 3274          | 80            | 3508         |
| more than 12       | 556          | 12706         | 301           | 13563        |
| Single PO          | 22           | 533           | 16            | 571          |
| <b>Grand Total</b> | <b>732</b>   | <b>16513</b>  | <b>397</b>    | <b>17642</b> |

Table 5- Cost Saving Analysis through Vendor Analysis

**Appendix-G**

| Count of No Of POS      |  | Column Labels |             |
|-------------------------|--|---------------|-------------|
| Row Labels              |  | single vendor | Grand Total |
| Single PO               |  | 16            | 16          |
| Haverda Enterprise Inc. |  | 2             | 2           |
| <b>Grand Total</b>      |  | <b>16</b>     | <b>16</b>   |

| Count of No Of POS              |  | Column Labels |             |
|---------------------------------|--|---------------|-------------|
| Row Labels                      |  | single vendor | Grand Total |
| Between 1 and 12.               |  | 80            | 80          |
| Clements paint & decorating Inc |  | 3             | 3           |
| CompSol, Inc.                   |  | 1             | 1           |
| Gulf coast paper co Inc.        |  | 6             | 6           |
| Miller uniforms & Emblems Inc.  |  | 2             | 2           |
| Sid Tool co Inc                 |  | 1             | 1           |
| Spillar custom hitches Inc.     |  | 2             | 2           |

|                    |           |           |
|--------------------|-----------|-----------|
| Trace Systems Inc. | 2         | 2         |
| W Grainger Inc.    | 7         | 7         |
| <b>Grand Total</b> | <b>80</b> | <b>80</b> |

Table 6- Single PO and Vendor Analysis

## Appendix-H

| Count of No Of POS  | Column Labels |             |
|---------------------|---------------|-------------|
| Row Labels          | single vendor | Grand Total |
| <b>more than 12</b> | <b>301</b>    | <b>301</b>  |
| <b>Grand Total</b>  | <b>301</b>    | <b>301</b>  |

| Count of No Of POS                   | Column Labels |             |
|--------------------------------------|---------------|-------------|
| Row Labels                           | single vendor | Grand Total |
| <b>more than 12</b>                  | <b>301</b>    | <b>301</b>  |
| Clements paint & decorating Inc.     | 7             | 7           |
| Crawford Electric supply company Inc | 6             | 6           |
| D & A Wire Rope Inc.                 | 3             | 3           |
| D Reynolds company LP                | 2             | 2           |
| Deere & Co                           | 2             | 2           |
| Environmental Improvements Inc       | 2             | 2           |
| Equipment Depot                      | 1             | 1           |
| Ewing Irrigation Products Inc        | 2             | 2           |
| Ferguson Enterprises Inc             | 7             | 7           |
| Gulf coast paper Co Inc.             | 4             | 4           |
| Haverda Enterprises Inc              | 7             | 7           |
| HD Supply Waterworks Ltd             | 8             | 8           |
| Henry Schein Inc                     | 3             | 3           |
| HK Fastener & supply Inc             | 3             | 3           |
| Hull Supply Co Inc.                  | 2             | 2           |
| Industrial Distribution Group Inc.   | 2             | 2           |



|                                     |            |            |
|-------------------------------------|------------|------------|
| LAKESIDE Equipment corp             | 2          | 2          |
| Pathmark Traffic products           | 2          | 2          |
| PG Creator LLC                      | 2          | 2          |
| Printmailpro.com                    | 2          | 2          |
| Purvis industries Ltd               | 3          | 3          |
| Regal plastic supply Co Inc.        | 2          | 2          |
| River city marketing Inc            | 2          | 2          |
| Safety supply Inc                   | 3          | 3          |
| Santex truck center Ltd             | 2          | 2          |
| Service wear Apparel Inc            | 4          | 4          |
| Sharon Pike                         | 3          | 3          |
| Shi-Government Solutions Inc        | 1          | 1          |
| SID TOOL CO INC                     | 2          | 2          |
| Siddons-Martin Emergency Group, LLC | 1          | 1          |
| Sidney E Bellamy                    | 1          | 1          |
| Silbee Ford Inc                     | 2          | 2          |
| Southern Safety Sales Inc           | 2          | 2          |
| Spillar Custom Hitches Inc          | 2          | 2          |
| SSI Emegency Equipment Inc          | 1          | 1          |
| Strong Group Inc (THE)              | 1          | 1          |
| Sunbelt Supply LLC                  | 5          | 5          |
| The Lab Depot Inc                   | 2          | 2          |
| W W Grainer Inc                     | 19         | 19         |
| <b>Grand Total</b>                  | <b>301</b> | <b>301</b> |

*Table 7- Analysis of High PO and Vendors*

### Appendix-I

| Row Labels                                 | Sum of<br>ITM_TO<br>T_AM | Max of<br>ITM_TO<br>T_AM2 | Min<br>of<br>unit_<br>price | Average of<br>unit_price | % Of<br>Variatio<br>n |
|--|--------------------------|---------------------------|-----------------------------|--------------------------|-----------------------|
| AAD Refills first aid kit outdoor burn jel | 12.5                     | 12.5                      | 0.5                         | 0.5                      | 100                   |
| 50 Amp Circuit Breaker                     | 387.2                    | 387.2                     | 9.68                        | 9.68                     | 100                   |

|  |          |         |       |             |                 |
|--|----------|---------|-------|-------------|-----------------|
| 5M569 Refills first aid kit antiseptic Towelettes          | 7.8      | 7.8     | 0.78  | 0.78        | 100             |
| A102.1 Whisper Pak? Procedure Pack #4-100083-00 to include | 14531.5  | 6466    | 31.29 | 32.765      | 104.713<br>9661 |
| Adaptor Pvc Sched 40 1 in to 1 in MIPT                     | 3.2      | 3.2     | 0.32  | 0.32        | 100             |
| Adaptor Pvc Sched 40 1 in to 1/2 in PVC to 1/2 in FIPT     | 2.33     | 2.33    | 0.333 | 0.333       | 100             |
| Adaptor Pvc Sched 40 2 in to 2 in FIPT                     | 28.3     | 16.5    | 0.66  | 0.92        | 139.393<br>9394 |
| Adapter male (Mipt x Slip) Pvc Sched 40                    | 15.3     | 15.3    | 1.53  | 1.53        | 100             |
| Air conditioner parts and access                           | 750      | 750     | 250   | 250         | 100             |
| Air Conditioners and Parts                                 | 18506.66 | 4649.24 | 0     | 38.78277778 | NA              |
| Air Conditioning, Heating and Ventilation                  | 5200     | 5200    | 520   | 520         | 100             |
| Alloy Metal: Angles, Sheets, etc.                          | 98       | 98      | 98    | 98          | 100             |
| All-Purpose Sponges Kendall # 9024 Versalon? 4" X 4", 4    | 498.95   | 498.95  | 1     | 1           | 100             |
| Aluminum Sulfate   | 1110     | 1110    | 185   | 185         | 100             |

Table 8- Purchase Price variance